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the nation, the writer believes this represents a step in the right direction for the preparation of teachers for the junior high school and the small high school.

### DISCUSSIONS.

The two short discussions seem to require no comment. We should be glad if Question 45, printed above, which is called forth by Professor Bradley's discussion of the Diophantine equation  $t^3 = x^3 + y^3 + 1$ , should receive some interesting replies. Mr. Roman's note on a humble phase of the mathematics of investment should be entertaining.

#### I. ON A DIOPHANTINE EQUATION.<sup>1</sup>

BY H. C. BRADLEY, Massachusetts Institute of Technology.

On page 77 of the February number of the MONTHLY, Professor R. D. Carmichael asks, among other things, for a general solution of the Diophantine equation  $t^3 = x^3 + y^3 + 1$ .

I wrote to Professor Carmichael, calling attention to the following. In his own *Diophantine Analysis*, p. 65, he gives a general solution of  $x^3 + y^3 = u^3 + v^3$  as follows:

$$\begin{aligned} x &= -(a - 3b)(a^2 + 3b^2) + 1, & y &= (a + 3b)(a^2 + 3b^2) - 1, \\ u &= -(a^2 + 3b^2)^2 + (a + 3b), & v &= (a^2 + 3b^2)^2 - (a - 3b). \end{aligned}$$

Now let  $a = 3b$ , then let  $2b = r$ , and change the variables, and we have

$$x = 9r^4 - 3r, \quad y = 9r^3 - 1, \quad t = 9r^4;$$

which is a solution of  $t^3 = x^3 + y^3 + 1$ .

Or, if we assume the possibility of a solution of the form  $x = Ar^4 - Br$ ,  $y = Cr^3 - 1$ ,  $t = Ar^4 + Dr$ , the coefficients may be determined as above.

This solution gives  $9^3 = 6^3 + 8^3 + 1$ ,  $144^3 = 138^3 + 71^3 + 1$ ,  $729^3 = 720^3 + 242^3 + 1$ , etc. It fails to include the trivial case  $x = y = 0$ ,  $t = 1$ .

Professor Carmichael replied that this was interesting, but asked if I could prove that it gave all non-trivial integral solutions of the given equation. This I cannot do. So at his suggestion I am sending the result, thinking that perhaps some other readers of the MONTHLY might be interested to work on it.

#### II. A NOTE ON WAR SAVINGS STAMPS.

BY IRWIN ROMAN, Northwestern University.

The accompanying table illustrates an interesting property of the War Savings Stamps issued by the government in 1918. A similar table holds for later issues. The third column gives the amount which the post-office will pay for each five dollar stamp during the month. If we consider this amount as reinvested, the fourth column gives the profit accrued at maturity, while the fifth column gives the per cent. this profit is of the amount thus reinvested. The final column shows the annual rate of interest corresponding to the case.

<sup>1</sup> Extract from a letter to the Editor.

Table.

Year	Month	Redemption	Actual	Profit	Rate Per Year
		Value		Per Cent.	
1918	Jan.	4.12	0.88	21.3	4.3
1919	Jan.	4.24	0.76	17.9	4.5
1920	Jan.	4.36	0.64	14.6	4.9
1921	Jan.	4.48	0.52	11.6	5.8
1921	April	4.51	0.49	10.9	6.2
1921	July	4.54	0.46	10.1	6.7
1921	Oct.	4.57	0.43	9.4	7.5
1922	Jan.	4.60	0.40	8.7	8.7
1922	April	4.63	0.37	8.0	10.7
1922	July	4.66	0.34	7.2	14.4
1922	Oct.	4.69	0.31	6.6	26.4
1922	Nov.	4.70	0.30	6.4	38.4
1922	Dec.	4.71	0.29	6.2	74.4
1923	Jan.	5.00	Maturity		

While the table speaks for itself, four conclusions may be mentioned:

1. Stamps bought at the redemption value bear a rate of interest, calculated as simple interest, varying from 4.3 to 74.4 per cent. per year.
2. It becomes increasingly desirable to hold the stamps till maturity.
3. When sale is necessary, the post-office becomes an increasingly cheaper buyer than a private individual.
4. A loan with the stamps as collateral becomes increasingly desirable as opposed to sale.

For the sake of simplicity, all calculations are referred to the first day of the month and all interest is assumed to be simple. The writer has never had this aspect of the War Savings Stamps called to his attention, and believes it might be of interest, if not of value, to readers of the MONTHLY.

## RECENT PUBLICATIONS.

### BOOK REVIEWS.

*Les Principes de L'Analyse Mathématique. Exposé Historique et Critique.* By PIERRE BOUTROUX. 2 volumes, Paris, A. Hermann & Fils, 1914-1919. Royal 8vo. xi + 547 + 512 pages. Price 14 + 20 francs.

In these two volumes we have one of the most suggestive historical and critical surveys of the whole field of elementary mathematics that has appeared in recent times. The purpose of the work may be best stated in the words of the author: "Except for these restrictions [demonstrations of certain theorems and detailed explanations of technique] the present work contains all or nearly all the material contained in the course in 'general mathematics' given in our